Electronic Supplementary Material (ESI) for Journal of Materials Chemistry C.

Journal of Materials Chemistry C RSCPublishing

ARTICLE

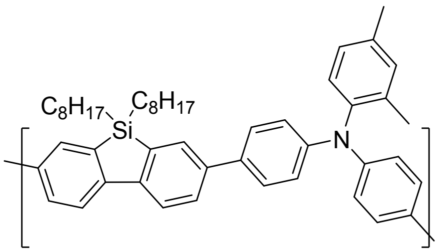
Compatibility of Amorphous Triarylamine Copolymers with Solution-Processed Hole Injecting Metal Oxide Bottom Contacts

Cite this: DOI: 10.1039/x0xx00000x

Stephen Logan,[a] Jenny E. Donaghey,[b] Weimin Zhang,[b] Iain McCulloch[b] and Alasdair J. Campbell[a]*

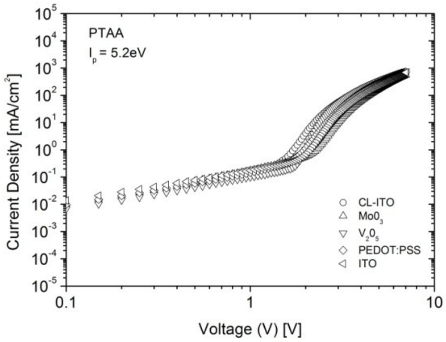
Supporting Information

Synthesis of poly(9,9-di-n-octyldibenzosilole-*co*-2,4-dimethyltriarylamine) P1

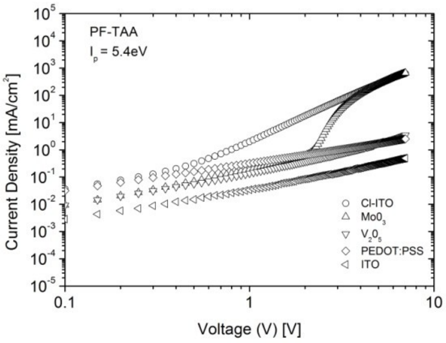


PSiF-TAA

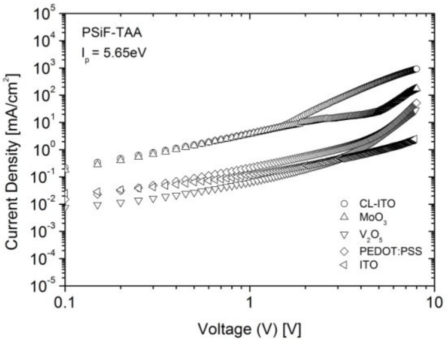
A multi-neck round bottomed flask was charged with 2,7-bis(4,4,5,5-tetramethyl-1,3,2-dioxaboralane-2-yl)-9,9-dioctyldibenzosilole (400 mg, 0.61 mmol), 4,4-dibromo-2,4-dimethyltriarylamine (262 mg, 0.61 mmol), [Pd(OAc)$_2$] (7 mg, 0.05 mmol), aqueous tetraethylammonium hydroxide (20 % solution in water, 5 mL) and toluene (20 mL). The mixture was degassed for 10 minutes with nitrogen. Tricyclohexylphosphine tetrafluoroborate (46 mg, 0.13 mmol) was then added and the mixture was degassed, while stirring, for a further 30 minutes. The reaction was then heated to 100 °C and stirred at this temperature for 72 h under nitrogen. The reaction mixture was allowed to cool, then it was added dropwise to a flask of cold, vigorously stirring methanol (200 mL). The resulting yellow precipitate was filtered and redissolved in toluene. This was then washed with sodium diethylthiocarbamate (400 mg in 75 mL H_2O) to remove the palladium. The organic layer was separated, dried ($MgSO_4$) and filtered through a plug of silica. The solution was then concentrated to 10 mL and re-precipitated in methanol. The yellow precipitate was recovered and subjected to Soxhlet extraction with acetone (12 h), hexane (12 h) and chloroform (24 h). The chloroform fraction was concentrated and re-precipitated in methanol to yield the *title* compound (148 mg, 38 %) as a yellow solid. GPC analysis in chlorobenzene: M_n 29 kDa, M_w 75 kDa; δ_H (400 MHz, $CDCl_3$) 7.91-7.00 (17H, m, Ar*H*), 2.41 (3H, s, ArC*H*$_3$), 2.12 (3H, s, ArC*H*$_3$), 1.58 (6H, s, OCC*H*$_3$), 1.37-1.08 (24H, m, C*H*$_2$), 1.05-0.42 (10H, m, C*H*$_2$); λ_{max} ($CHCl_3$) 379 nm.



(a)



(b)



(c)

Figure S1. Graphs showing original JV curves (not corrected for V_{bi}) for injecting contacts Cl-ITO, MoO_3, V_2O_5, PEDOT:PSS, ITO (oxygen plasma treated) (a) PTAA, (b) PF-TAA and (c) PSiF-TAA.

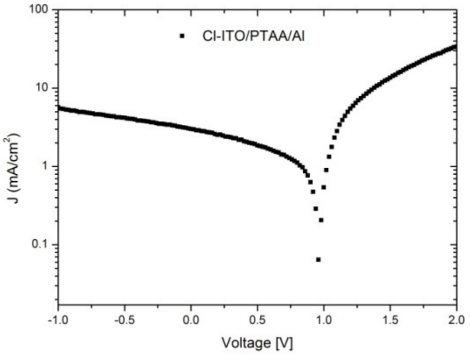


Figure S2. Graph showing representative photocurrent current-voltage characteristic for V_{bi} measurement in Cl-ITO/PTAA/Al device. Illumination was via a Newport 1.5AM solar light source.

	PTAA	**PF-TAA**	**PSiF-TAA**
ITO	1V	-0.43V	-0.2V
PEDOT:PSS	1V	-0.39V	0V
V_2O_5	1V	-0.41V	-0.1V
MoO_3	0.8V	-0.40V	0V
Cl-ITO	1V	-0.40V	0V

Table S1: Table showing measured built-in-voltage (V_{bi}) values obtained from photocurrent measurements for all devices.